Bell Work
19/20-Jan-16

Name all of these and give the formula weights (masses)

$Ca(OH)_2$ SiO_2 $(NH_4)_2Cr_2O_7$

TiO Fe_2O_3

Objective:

You will KNOW what a mole is

You will be able to convert from grams to moles

- Know how to calculate molar mass
- Convert between grams and mole

MOLE

The mole is a unit of measurement, like a ton or a dozen

Ton = 2000 of something

Dozen = 12 of something

1 Mole = 6.02×10^{23} of something

http://youtu.be/TEl4jeETVmg

The Mole and Molar Mass

Q: Why don't we simply stick with units like grams, nanograms (ng), kilograms (kg), etc.?

A: Moles give us a consistent method to convert between atoms/molecules and grams

MOLAR MASS

The mass of 1 mole of a compound is called *molar mass*

Molecular Mass (amu) = Molar Mass (grams/ mole)

Molecular Mass of H_20 = 18 a.m.u.

Molar Mass of H_20 = 18 g/mol

MOLAR MASS

Molecular Mass (amu) = Molar Mass (grams/ mole)

Molecular Mass of CO_2 = 44 a.m.u.

Molar Mass of CO_2 = ? g/mol 44g/mol

What are the molar masses of - NaCl, O_2, and $Pb(NO_3)_2$?

Molar Mass

Molar Mass: The weight in grams of 1 mole of an element.

What the molar mass of oxygen: 15.99g/mol

What about: Cl?

Formula Mass: The weight in grams of 1 mole of a compound.

What is the Formula mass of H20: 18g/mol

What about CO_2 and $HC_2H_3O_2$

MOLES TO GRAMS

Multiply number of moles by molar mass

#mol of Y x molar mass = grams of Y

$$2 \text{ moles } H_2O \times \frac{18g\ H_2O}{\text{mole } H_2O} = 36g\ H_2O$$

PRACTICE

How many grams of the following?

2 moles HCl → ? grams HCl (find M.M. HCl first)

3.5 moles KNO_3 →? grams KNO_3

2.4 moles lead (II) hydroxide →? grams

Practice

What is the mass of 1 mole (molar mass) of:

1. H_2 2. $Mg(OH)_2$ 3. CO_2
4. NH_4Cl 5. $CuSO_4$ 6. $AgNO_3$

Convert from grams to moles, or moles to grams

7. How many moles is 12.5 g of magnesium hydroxide?
8. How many moles is 1.46 g of hydrogen gas (H_2)?
9. How many grams are in 4.3 moles of ammonium chloride?

Reaction Type Prediction

$2Ag_2O \rightarrow 4Ag + O_2$

Lead (II) chloride reacts with lithium sulfate to produce lead (II) sulfate and _____

Carbon tetrahydride reacts with oxygen to produce…?

Nitrogen trihydride reacts with hydrochloric acid to produce ammonium chloride

In Class

Page 196 problem #28

Read 198-203 problems #33-37

Due 21-Jan-16

Bell Work
27-Jan-2017

What is the formula mass (g/mol) of glucose

$C_6H_{12}O_6$?

If there are 10g of glucose how many moles would there be?

EQ: What responsibilities do I have as an American to my country, community, family and self?

Objective:

You will easily be able to convert between moles, atoms, and grams of a single substance.

- You will know when to use Avigadro's number

Avogadro's Number

A set number of atoms with a mass in grams (g) equal to the mass of one atom in atomic mass units (amu).

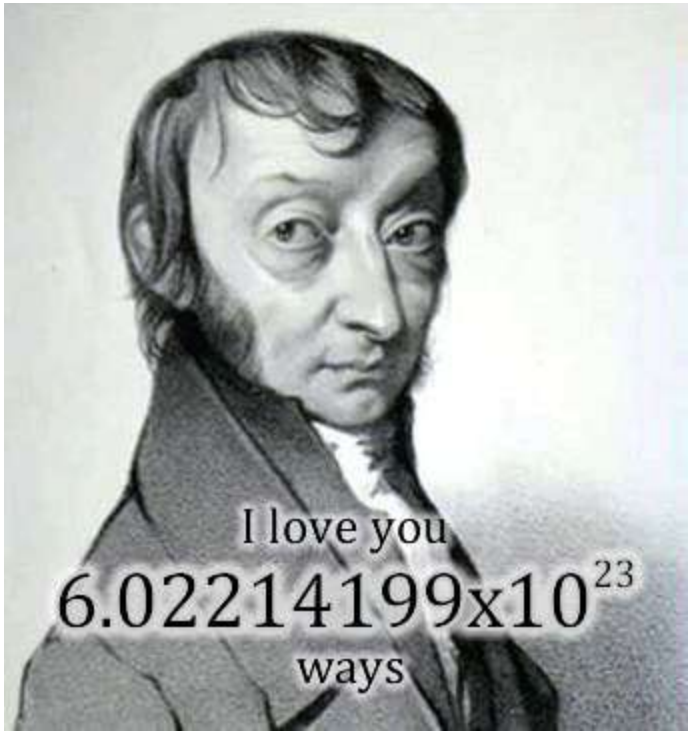
Avogadro's number =

6.02×10^{23} atoms/ molecules/ particles

WHAT'S A MOLE

A mole is the quantity of anything that has the same number of particles found in 12.000 grams of carbon-12

That number of particles is Avogadro's Number: 6.02×10^{23}



MOLE

If I have a mole of Mr. Golden's then I have a 6.02×10^{23} Mr. Golden's.

If I have a mole of pens then I have 6.02×10^{23} pens

Conversion factor:

$$\frac{\mathbf{6.02 \times 10^{23}\ some\ things\ (atoms,\ etc)}}{\mathbf{mole}}$$

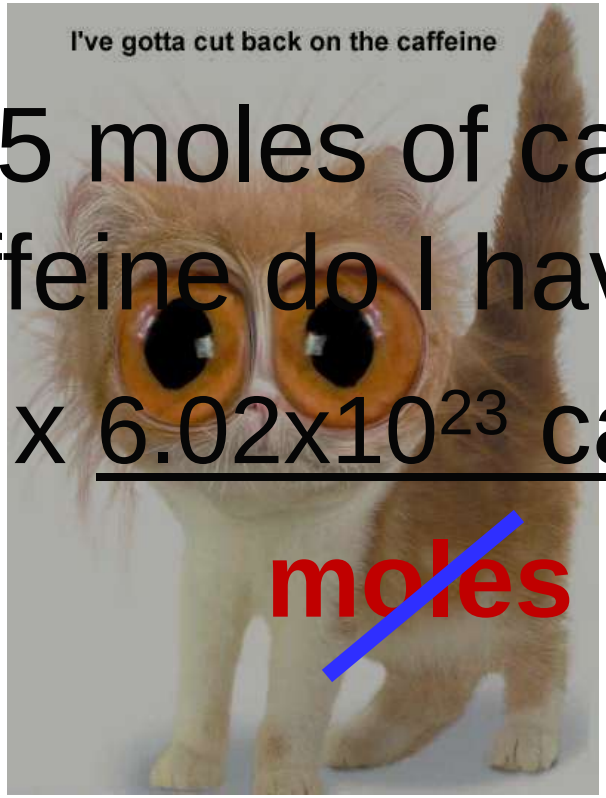
PRACTICE

If Mr. 2 Chainz has 2 moles of chainz then he has:

$$2 \text{ moles} \times \frac{6.02 \times 10^{23} \text{ chainz}}{\text{moles}} = ?$$

1.2×10^{24} chainz

PRACTICE



If I have 4.5 moles of caffeine how much caffeine do I have?

$4.5 \text{ moles} \times \frac{6.02 \times 10^{23} \text{ caffeine}}{\text{moles}} = ?$

2.71×10^{24} caffeine

ATOMS TO MOLES

Atoms/ molecules → moles

# of atoms X $\frac{\text{moles}}{6.02\text{x}10^{23}\text{ atoms}}$ = # of moles

Moles → Atoms/ molecules

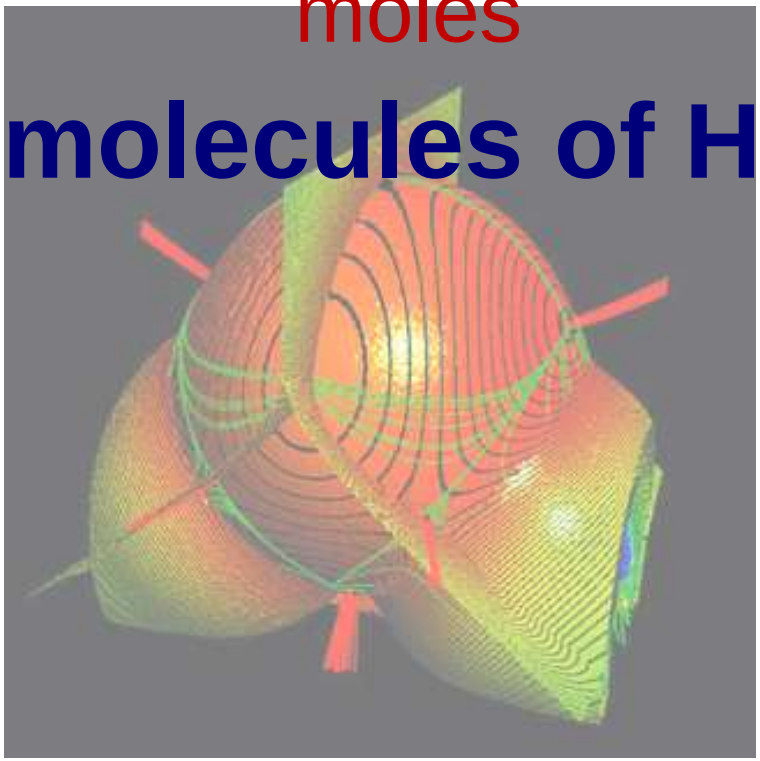
# of moles X $\frac{6.02\text{x}10^{23}\text{ atoms}}{\text{moles}}$ = # of atoms

PRACTICE

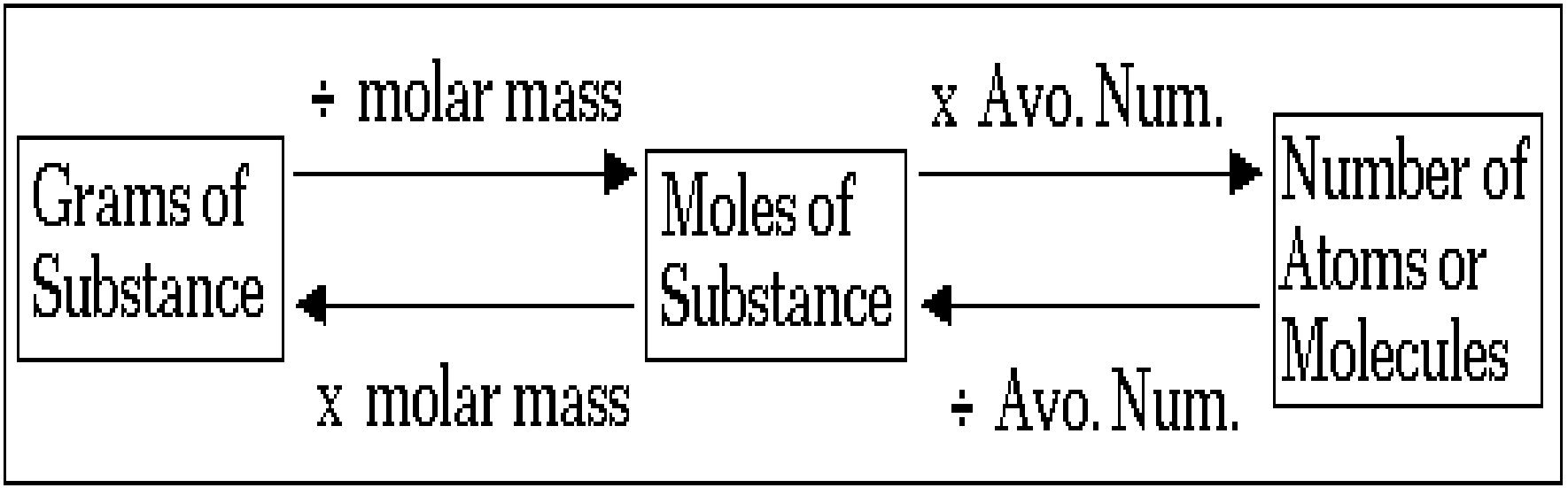
If I have 1.5 moles of H_2O then I have:

1.5 moles x $\frac{6.023 \times 10^{23} \text{molecules of } H_2O}{\text{moles}}$ = ?

9.03×10^{23} molecules of H_2O



Grams ← → Moles ← → Atoms



Molecules, Atom, Grams, and Mole Calculation Practice

In your lab groups you will work out ***Every*** example stepwise as a team

-each person need to have all of the examples and practice problems w/ all work for credit shown

As a team Write out assigned problems and correct set up to solve on poster paper

Home Work Finish In Class work form 24Jan17

Page 196 problem #28

Read 198-203 problems #33-37

Due 30-Jan-17

Bell Work
30-Jan-2017

A modern cars combustion engine produces energy through the combustion of gasoline and/ or ethanol plus various other additives, for purposes of ease assume the reaction between gasoline and oxygen produces 105.0g of carbon dioxide every 30s while driving at highway speed.

Using this data, how many molecule of carbon dioxide are produced every 30s? Every hour?

Agenda

Mole Bean lab

Objective:

You will **KNOW** how the value of a mole was calculated and what a mole is!!!

EQ: After a win on a sports field or an academic assignment what is your next responsibility in order to repeat on the next challenge?

Mole Bean Lab

Follow all directions.

The formulas you need are on the bottom of the first page

Return all of the beans to the correct beaker at the stock table when you are finished.

Bell Work
31-Jan-2017

i. What is the difference between molar mass and number of molecules?

ii. Suppose you have 2.5 X 10^{32} atoms of Bromine (Br), how many grams of Br_2 do you have?

iii. On a scale of 1-3 how confident are you in your ability to solve this problem?

1= not confident, 3 = confident

iv. Is it possible to solve this problem using only one step (conversion factor)?

Agenda

Finish Mole Bean lab

Continue to work of example practice problems for:
$g_A \leftrightarrow mol_A \leftrightarrow molecules_A$

Objective:

You will **KNOW** how the value of a mole was calculated and what a mole is!!!

EQ: After a win on a sports field or an academic assignment what is your next responsibility in order to repeat on the next challenge?

Mole Bean Lab

Follow all directions.

The formulas you need are on the bottom of the first page

Finish Part 2,

Dou 3-Feb-2017

Test Tomorrow, 1.Feb.2017

Lewis Structure

Molecular geometry

Net Ionic Equations